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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,077	09/16/2003	Hiroshi Funada	CU-6013	2051

26530 7590 08/06/2008

LADAS & PARRY LLP
224 SOUTH MICHIGAN AVENUE
SUITE 1600
CHICAGO, IL 60604

EXAMINER	
ANGEBRANNDT, MARTIN J	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
08/06/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/663,077	FUNADA ET AL.	
	Examiner	Art Unit	
	Martin J. Angebranndt	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 May 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5 and 8-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5 and 8-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. The response of the applicant has been read and made of record. Responses to the arguments of the applicant are presented after the first rejection to which they are directed. The amended figures and text are accepted for entry into the specification. Rejections from the previous office action not repeated below are withdrawn based upon the amendments and arguments of the applicant. The claims have been amended to include a limitation the widths of the protrusions:recesses in the duplication plate are in the range of ~(0.905 to 0.667) on the basis of the text at [0140] and [0143] of the prepub. The amendment to the claims overcomes the rejection based upon Shvartsman et al.,

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1,2,5,10-11 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edwards WO 99/52105, in view of Nebashi et al. '870 and Takahashi et al. JP 02-010536.

Edwards WO 99/52105 describes master disks which can be used in disk molding processes to form replica disks having wide flat lands and deep narrow grooves. (10/25-11/5). In figures 16-18, the pitch is 0.375 microns (375 nm) and the width at the flat bottom of the groove is 146, 185 or 205 nm. Measurement of the figure 13 shows the width of the Protrusion:Recess to be ~ 0.85. Figure 19 shows the use of intermediate masters. The use of molding to form the optical disk substrates is disclosed. (17/1-10 and 18/5-15). Photopolymers for forming replication layer (replica disks) are disclosed. (page 20) As the width of the flat part of the

recess is nearly equal to or greater than ½ the pitch and the protrusions are pointed (ie no width), the cross-sectional area of the protrusions above the midline is held to be less than the cross-sectional area of the recesses below the mid-depth line of the recesses.

Nebashi et al. '870 teaches the formation of a stamping master, where the grooves having a width of 0.35 microns are formed in the stamping master, which is then coated with a light curing resin, a backing plate applied and UV light used to cure the resin to form an optical recording medium substrate of an olefin polymer with the grooves being formed in a UV cured resin, which is then coated with reflective and recording layer to form the recording medium. (10/23-45)

Takahashi et al. JP 02-010536 (translation attached) teaches molding optical recording media substrates and establishes the equivalence of injection, compression and 2P (polymerization) molding processes (translation on page marked 16, last full paragraph).

It would have been obvious to use the master of Edwards WO 99/52105 directly to form a replica disk using a 2P process such as that described by Nebashi et al. '870, where a radiation curable resin is used to form the replica optical disk substrate based upon the direction to molding and the use of photopolymerizable materials to form replicas by Edwards WO 99/52105 and the disclosure of equivalence in the various molding techniques by Takahashi et al. JP 02-010536.

The applicant argues that the references applied are directed to optical recording media and that therefore they are not embraced by the diffractive claims language. **The examiner notes that the grooves are formed at regular intervals (pitch) and that they diffract light. The applicant may look at a CD to verify this and note the diffraction of the light into the**

different colors. The optically diffraction layer is the curable resin and the language of the claims makes it clear that this is embossed/molded by the duplication plate material. The composition of the duplication plate material is not recited in the claim, so the embossing means described in either of Edwards WO 99/52105 or Nebashi et al. '870 meet claims 1 and 5. The replica discs 1, and 3 have the same polarity as the photoresist master disc and therefore have a greater spacing between the protrusion features than the width of the protruding features. This is also illustrated in figures 2a-3B, where the stamper is coated with resin 22 which is hardened and released to form layer 23 and then coated with a resin (31) which is hardened and used as the final disc substrate where the protrusions are narrower than the grooves separating them. This also shows the use of cured materials as the material performing the embossing/molding. The rejection stands.

The optical recording stamping master of Edwards WO 99/52105 is the duplication plate having the protruding/peak shape narrower than at least one of the adjoining groove/valleys as discussed above. The application discloses that UV is ionizing radiation in the prepub of the instant specification in figure 2 and [0091], which is the radiation used in the replication process of Nebashi et al. '870. As the groove widths vary requirement (a) is met, as it is inherently a relief hologram (concentric in the same manner as a Fresnel lens hologram), requirement (c) is met and as there are a plurality of peak/protrusion and valley/groove shapes/features with the peaks/protrusions being separated from each other by grooves, requirement (b) is met. The intermediate product of the embossed substrate and the process for its formation as discussed above meet the claims. The examiner is not stating that the final optical recording media necessarily meets the claims as it may be coated with a recording layer, but the language of the

claims fails to exclude concentric diffractive patterns, such as those found in optical recording media substrates. The claims describe the portions of the structure of the holographic features/topography, but not the appearance of the final articles. The applicant argues that a visually bright structure is formed, but fails to appreciate that this is not the case until the reflective layer (27) is applied. The applicant does not seem to appreciate that the groove structure is a grating. The examiner notes that Martens '850 establishes the equivalence of diffraction gratings and video disks. The curing can be either during or after the embossing and meet the claims.

The applicant's arguments fails to account for the wide range of duty cycles taught by Edwards WO 99/52105, including the that illustrated in figure 13 which has a ratio of ~0.85 which is bounded by the language of the claims.

4. Claims 1,2,5 ,8-11 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edwards WO 99/52105, in view of Nebashi et al. '870 and Takahashi et al. JP 02-010536, further in view of Parker et al. '825.

Parker et al. '825 teach that the formation of holograms using an embossing shim applied to the outer surface of a roller. (1/24-60,2/11-55). The use of a shim wrapped around a cylinder and to emboss/mold optical recording media substrates (1/61-2/10).

In addition to the basis provided above, the examiner holds that it would have been obvious to one skilled in the art to modify the process of Edwards WO 99/52105, in view of Nebashi et al. '870 and Takahashi et al. JP 02-010536 by using an embossing shim wrapped about a roller as this is old and well known in the art as evidenced by Parker et al. '825.

The examiner relies upon the response above as no further arguments beyond those addressed above were directed at this rejection.

5. Claims 1,2,5,10-11 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Webster et al. '385, in view of Wimberger-Friedl "Injection molding of sub-μm grating optical elements" in Specialized molding techniques, Heim et al., Ed. Pp. 149-155 and Martens '850.

Webster et al. '385 teaches the formation of diffraction gratings where the relief pattern is embossed into a plastic sheet, metalized, and then overcoated with an adhesive layer and a protective layer. The duty cycle is chosen based upon the optimum according to Maxwell's equations according to the desired color saturation (7/45-53 and 8/47-9/7). The grating pitch determines the color (10/19 and the formation of two areas having different gratings is disclosed with respect to figure 4. The formation of different grating depths is also shown in the figures(see 4a).

Wimberger-Friedl "Injection molding of sub-μm grating optical elements" in Specialized molding techniques, Heim et al., Ed. Pp. 149-155 teaches with respect to figure 4 (upper figure shown on page 152) an RIE mold insert for forming a grating where the ratio of the width of the protrusions and the the width of the spaces between them is ~ 0.82 (duty cycle is ~0.45). The final article molding into polycarbonate has a duty cycle of ~0.6 and above 0.5 (page 150). The accuracy of the high aspect ratio transfer in the formation of ¼ retardation gratings in polycarbonate is disclosed (see page 154).

Martens '850 teaches methods for replicating diffraction gratings, video disks and the like using photocurable compositions. (1/5-14). These processes are described as having better

fidelity of the original image than hot stamping or other embossing processes. (1/15-26). Various masters are disclosed (39/13-40/5). In example 21, the process is described with respect to figure 9, as the photocurable resins is pumped onto the master dies bearing the relief pattern, the back is provided with a polyester backing/support, the UV mercury arc lamps are used to cure the resin, resulting the patterned laminate bearing a (diffractive) Fresnel lens (55/11-50). Figures 10B shows the case where either large or small protrusions relative to the grooves/recesses are formed (4/8-38).

It would have been obvious to one skilled in the art to modify the teachings of Webster et al. '385 to form embossed gratings with duty cycles of more than 50% in the optimization of the color saturation according to Maxwell's equations based upon the direction to do so within Webster et al. '385 and the teachings of Wimberger-Friedl "Injection molding of sub-μm grating optical elements" in Specialized molding techniques, Heim et al., Ed. Pp. 149-155 and to use other processes, such as that of Martens '850 using photocurable resins, in place of the stamping methods to increase the fidelity as taught by Martens '850 and further in view of the known use of gratings with the cross section shown in figure 10B in Martens '850.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The optically diffraction layer is the curable resin and the language of the claims makes it clear that this is embossed/molded by the duplication plate material. The composition of the duplication plate material is not recited in the claim, so the embossing means described in either of Webster et al. '385 or Martens '850

meet the claim limitations. The use of the UV curable resins as the replication medium is clearly taught by Martens '850, who also along with Webster et al. '385 teach media which have a duty cycle such that the protrusions are smaller in width than the grooves separating them. The rejection stands.

The applicant's new limitation and arguments are addressed by the teachings of Wimberger-Friedl "Injection molding of sub-μm grating optical elements" in Specialized molding techniques, Heim et al., Ed. pp. 149-155 which teaches that final gratings have duty cycles or ~0.6 and the molding master has a widths of the protrusion:recesses of ~0.82. which is bounded by the language of the claims.

6. Claims 1,2,5,10-11 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Webster et al. '385, in view of Wimberger-Friedl "Injection molding of sub-μm grating optical elements" in Specialized molding techniques, Heim et al., Ed. pp. 149-155 and Martens '850 combined with (Ueda et al. JP 2000-063459 or Sakguchi JP 05-046063).

Ueda et al. JP 2000-063459 teach the UV curing after the embossing step has been completed [0036, 045,0048]. (machine translation attached)

Sakguchi JP 05-046063 teaches the UV curing after the embossing step has been completed [0024]. (machine translation attached).

In addition to the basis provided above, the examiner holds that it would have been obvious to one skilled in the art to modify the processes rendered obvious by the combination of of Webster et al. '385, Wimberger-Friedl "Injection molding of sub-μm grating optical elements" in Specialized molding techniques, Heim et al., Ed. Pp. 149-155 and Martens '850 by performing the curing after separation form the embossing master as taught by either of Ueda et

al. JP 2000-063459 or Sakguchi JP 05-046063 with a reasonable expectation of forming a useful holographic replica as these are alternative shown in the art to be equivalent.

The examiner relies upon the response above as no further arguments beyond those addressed above were directed at this rejection.

7. Claims 1,2,5,8-11 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Webster et al. '385, in view of Wimberger-Friedl "Injection molding of sub-μm grating optical elements" in Specialized molding techniques, Heim et al., Ed. Pp. 149-155 and Martens '850 alone or combined with (Ueda et al. JP 2000-063459 or Sakguchi JP 05-046063) further in view of Parker et al. '825.

In addition to the basis provided above, the examiner holds that it would have been obvious to one skilled in the art to modify the process of Webster et al. '385, in view of Wimberger-Friedl "Injection molding of sub-μm grating optical elements" in Specialized molding techniques, Heim et al., Ed. Pp. 149-155 and Martens '850 or further combined with (Ueda et al. JP 2000-063459 or Sakguchi JP 05-046063) by using an embossing shim wrapped about a roller as this is old and well known in the art as evidenced by Parker et al. '825.

The examiner relies upon the response above as no further arguments beyond those addressed above were directed at this rejection.

8. Claims 1,2,5 and 8-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Webster et al. '385 combined with Wimberger-Friedl "Injection molding of sub-μm grating optical elements" in Specialized molding techniques, Heim et al., Ed. Pp. 149-155, Martens '850 and Parker et al. '825 alone, or further combined with (Ueda et al. JP 2000-063459 or Sakguchi JP 05-046063), in view of Yoshitake et al. '078 or Sakuri et al. '479.

Yoshitake et al. '078 teaches the formation of decorative gratings where the diffraction angles, and directions are distributed randomly in a predetermined range to make the patterns noticeable. (9/9/60-65). The formation of various patterns is disclosed. with respect to the figures.

Sakuri et al. '479 teaches features with different heights (figure 2).

In addition to the basis set forth above, it would have been obvious to one skilled in the art to modify the process of Webster et al. '385 as modified by Wimberger-Friedl "Injection molding of sub-μm grating optical elements" in Specialized molding techniques, Heim et al., Ed. Pp. 149-155, Martens '850 and Parker et al. '825 or as modified by Martens '850, Parker et al. '825 and (Ueda et al. JP 2000-063459 or Sakguchi JP 05-046063) by using it to form decorative holographic/grating patterns with randomly varied orientations as taught by Yoshitake et al. '078 and different heights as taught by Sakuri et al. '479 with a reasonable expectation of forming useful decorative holograms.

The examiner relies upon the response above as no further arguments beyond those addressed above were directed at this rejection.

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J. Angebranndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Martin J Angebranndt/
Primary Examiner, Art Unit 1795

Martin J Angebranndt
Primary Examiner
Art Unit 1795

8/4/2008